SANITARY COMMISSION.

No. 31.

REPORT

OF A

COMMITTEE APPOINTED BY RESOLUTION OF THE SANITARY COMMISSION, TO PREPARE A PAPER ON THE USE OF

QUININE

AS A PROPHYLACTIC AGAINST MALARIOUS DISEASES.

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1861.

REPORT.

As the Commission has already recommended the use of quinine as a preventive of malarial disease, in one of its published documents, (Doc. No. 17[2], "Rules for Preserving the Health of the Soldier," paragraph 25, issued July 13th, 1861,) it is assumed that the object of the present Report is to present a digest of the evidence upon which that recommendation was founded, with the view of procuring its timely adoption and enforcement by the authorities in immediate charge of the health of the army.

The term malarial or miasmatic disease is applied to the several forms of Intermittent fever, popularly called chills, or ague, of Remittent fever, and, under certain restrictions, to the diseases known as Continued and Typhoid fevers, as they occur in malarious districts of country; to a certain extent Dysentery may be also included in the list, and various modifications of other diseases, such as Catarrh, Rheumatism, and acute internal inflammations. In short, there are few forms of acute disease by which healthy individuals are liable to be attacked when exposed habitually to the influence of malarial poison, which are not modified in some degree by it, and thereby brought within the remedial influence of those agents by which malarious diseases are controlled.

By far the most powerful of the remedies for this class of diseases is sulphate of quinia, or quinine, the essential or active principle of Peruvian bark, and the facts just stated explain

the high value attached to this drug in the western and southern portions of our country, where diseases of malarial origin are most prevalent. Its curative properties are recognized and highly esteemed in all parts of the civilized world, and by physicians of every school. Happily they are not confined to the cure of miasmatic diseases alone; in virtue of its tonic or strengthening power, Quinine is valuable in debility arising from many other causes, promoting the appetite and power of digestion, and increasing the vital forces. Unlike many excellent medicines, it is destitute of noxious and poisonous qualities, and, unless rashly and injudiciously employed, never does serious harm; nor does it act only as a temporary stimulant, leaving a condition of greater weakness after its immediate effects have passed away, but rather, like nutritious food, confers permanently increased strength and power of resisting disease.

These facts, however, are known and used by all educated physicians, but there is one quality possessed by this valuable medicine which is not so generally appreciated, especially at the North, and which the Sanitary Commission desires to have recognized to the fullest possible extent for the benefit of our soldiers now in the field, and this is the power possessed by Quinine, when taken regularly in small quantities, of preventing an attack of disease in a healthy person exposed to malaria.

In order to estimate fully the value of this prophylactic or preventive property of Quinine, which is styled by a recent English writer "a modern discovery," it will be useful to rehearse a few well-established medical facts:

a. Individuals undoubtedly differ in degree of susceptibility, or in their liability to be attacked by miasmatic disease, but there is no amount of natural vigor of constitution, or positive

high health, which will confer immunity against the effects of the poison.

b. The young are usually more liable to the disease that those of mature age.

c. Poisoning from malaria is more liable to take place between the hours of sunset and sunrise, and in those who are fasting, fatigued, or deprived of sleep.

d. After exposure to malaria the attack of disease is not necessarily immediate ; a period of *incubation*, varying from six to twenty days, usually intervenes, and during this the individual may enjoy perfect health. The attack, when it occurs, may assume the form of Intermittent, or Remittent fever, or any of the other forms of miasmatic disease, varying in nature and degree of severity, according to the impressibility of the individual and the virulence of the poison ; or, the amount of poison imbibed may not have been sufficient to cause an explosion of purely miasmatic disease, but only enough to impress the miasmatic or paroxysmal type upon some intercurrent malady occasioned by another cause.

e. After long exposure to malaria, even though no actual attack of sickness may have occurred, a debilitated condition of health is liable to arise, characterized by a sallow complexion, diminished strength, and impoverished blood ; this is known as malarial cachexia.

Now, it is a well established fact in the experience of American physicians, that the daily use of a small quantity of quinine, say from three to six grains, in one or more doses, by those who are exposed to the danger of malarial poisoning, will in most instances prevent an attack of malarial disease, and that it will

always render the disease milder, if it should occur. It will also prevent the development of malarial cachexia.*

For those not familiar with this fact, there is ample evidence to be cited, not only in the popular and professional practice of our country, but also from foreign sources. We may refer to the well known popularity of "bark and wine" as a "tonic" in unhealthy localities and seasons, in all parts of this country; to the practice generally adopted in our merchant service for the Isthmus of Panama, and in vessels trading with other unhealthy ports, of taking quinine daily to avert attacks of fever, and to the frequent employment of the same preventive during the last twenty years in unhealthy localities in the West and South by planters, for themselves, their families, their overseers, and negroes.

A communication kindly furnished by the President of the Panama Railroad Company contains facts of much weight and interest:

"Soon after my connection with the Panama Railroad Company, in 1853, my attention was directed to the unusual amount of sickness which prevailed among the crews of vessels visiting Aspinwall. On inquiry, I could not learn that any of the crews who remained in that port for several days together were wholly exempt from attacks of fever. And it frequently occurred that a large part of them would be prostrated, especially within a few days after leaving port. This state of things induced me to investigate the whole subject, with particular reference to providing a remedy for so serious an evil. I soon became satisfied that the remedy was to be found in the regular, habitual use of quinine in moderate doses, for a few days prior to the arrival of vessels at Aspinwall and subsequent to their departure, as well as during the time they might remain in port.

"I accordingly took especial pains to impress my views upon all parties

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* The medicine may be taken in its simplest form as a powder, in a pill containing one or two grains, or dissolved in water, wine or spirits. It is generally more acceptable to the soldier in the latter form, hence the recommendation of "quinine bitters."

interested, so far as I had opportunity, and when, in 1855, the Panama Company established a line of sailing vessels of its own to run between this port (New York) and Aspinwall, I consulted with one of our intelligent physicians as to the best means to be employed to secure the faithful application of the proposed remedy. Aware of the proverbial carelessness of sailors in regard to such matters, and the difficulty that might be encountered in efforts to make them take *medicine*, he recommended such a preparation of wine and quinine as, under the name of '*wine bitters*,' would not be unpalatable.

"Such preparation was immediately provided and placed on board of every vessel of the line, with printed directions as to the manner of using it, the captains also being instructed to insist upon its use, in accordance with these instructions, by every man on board of their vessels.

"The result of this course exceeded our most sanguine expectations. From its very commencement a change for the better was seen, and during the last four years, in which seven vessels have been constantly employed in the trade, cases of sickness have rarely occurred—certainly not one case in ten, as compared with former times.

"The practice of using quinine, as above stated, is continued to the present day, and so uniformly healthy are the crews of our vessels that the subject no longer excites our solicitude.

"I would also remark that the use of quinine by the officers and employees of the company on the Isthmus has been found very beneficial, and in connection with this, and the clearing and settlement of the adjacent country, Aspinwall has become one of the healthiest tropical ports of which I have any knowledge."

I am, Dear Sir, with high respect,

Your obed't servant,

DAVID HOADLEY.

WM. H. VAN BUREN, M. D., &c., &c.

The highest American authority on the *materia medica*, Prof. Geo. B. Wood, M. D., of the University of Pennsylvania, expresses his opinion on the subject in the following language: "Upon the same principles as those on which periodical diseases may be cured, they may also be prevented by the sulphate of quinia. There is no prophylactic measure against the miasmatic fevers at all comparable in efficiency to the use of this medicine. It seems reasonable to suppose that the same

impression on the system which prevents the return of the paroxysms will prevent the occurrence of the first. Experience has established the correctness of this inference."*

From another quarter of our country we have the following evidence from a competent and reliable observer, Dr. H. W. De Saussure, of Charleston, S. C.: "I think that I have been able to collect a sufficient number of data to render the opinion plausible, if not conclusive, that quinine possesses the power of protecting the white man from attacks of intermittent and remittent fever, or its collaterals, when exposed for even long periods to malarious influences; and, moreover, that its daily use is in no wise injurious to health, nor does its habitual use render the system insusceptible of its remedial powers." Among other cases, he relates the following in support of his views:

"An overseer agreed to take charge of several rice plantations in one of the sickliest regions of rice culture, undertaking to spend the summer months on one of the plantations. He made no enquiry as to the health of the one chosen as his residence—it was selected from its convenient locality. When warned of the danger of his residing there in summer, he said he would never have the fever. His confidence in his capacity to resist malarious disease seemed unlimited. The result fully justified this confidence. He lived ten years or more in that neighborhood, spending every summer on the plantation, varied only by an occasional visit to the healthy pine land, where his family resided during the summer. He visited his rice fields without hesitation at any hour, day or night, that his business required. He never had an attack of fever during that time. I saw him after he had been there several years; a finer specimen of robust health it would have been difficult to find.

"It was ascertained, on inquiry, that it was his habit to take quinine

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* A treatise on Therapeutics and Pharmacology, or Materia Medica, by George B. Wood, M. D., late President of the American Medical Association; Professor of Theory and Practice of Medicine in the University of Pennsylvania; senior physician of the Pennsylvania Hospital; one of the authors of the United States Dispensatory, &c., &c. Philadelphia, 1861, vol. I., page 260.

daily, during the summer, before leaving his house; the quantity he did not know, for he never weighed it. His entire and complete confidence in his ability to resist fever in so malarious a region is strong evidence that he had been in the habit of using quinine, and was well satisfied of its prophylactic virtues. This case, in conjunction with the statements from the officers of the Niger expedition, would appear to prove that quinine may be used under exposure to malarious influences for an indefinite period, not only without compromising the general health of the individual, or injuring the constitution, but as surely protecting the system from the inroads of malarious disease."

The same writer further states, that he was "called in August to see one of the contractors on the Charleston and Savannah Railroad, laboring under a very severe attack of remittent fever, contracted during the superintendence of his contract between the Ashepoo and Combahee rivers, notoriously a very unhealthy region. During his convalescence he informed me that he would have to return to his work on the road, where he had a large number of hands employed (150); that they were negroes brought from healthy regions in North Carolina, and he expected all of them to be more or less sick, as they were entirely unaccustomed to a malarious climate. I advised him to take quinine daily himself, and to give it to all his hands, white or black. Late in the fall I met him in the city; he looked healthy and well. He thanked me for the advice I had given him; told me he had carried up some pounds of quinine; had used it himself daily, and compelled all his employees to take it also; that he himself had never had another attack of fever; that his health was better than it had ever been, and that not a single one of the 150 hands he employed had been attacked by fever. In fact, he said: 'The only case of sickness I have had was in a negro who had come from North Carolina sick.' "*

* American Journal of Medical Sciences, January, 1861, from Charleston Medical Journal and Review, July, 1860.

In April, 1840, the writer, then an assistant surgeon in the U. S. Army, was detached from the staff of the late General Worth, at Tampa Bay, Florida, for duty at a military post in the interior (Fort King), where a serious outbreak of miasmatic disease had just occurred. The stock of quinine on hand was limited and the supply uncertain, and every man at the post was having his turn of disease. To meet the emergency a quantity of quinine bitters was made in the following manner: The half of a barrel of whiskey was drawn off into a second barrel, and they were both filled with the bark of the dog-wood* and wild cherry, obtained from the neighboring hammock, and dried in the sun. A few ounces of quinine were added to each barrel, with the dried peel of a dozen native oranges. From one to two ounces of this preparation was given to every man at the post, morning and evening, with the effect, in a very short time, of rendering the relapses of fever less frequent and milder in their character, lengthening the interval between the attacks, and, in many instances, preventing their occurrence entirely during its use.

It may be inferred from the above statements that the preventive use of quinine is an economical measure, saving not only the health and services of the men, but reducing also the expenditure of the medicine, for the use of a very small quantity daily will prevent an attack of disease, for the cure of which a quantity much larger in the aggregate would probably be required.

Our excellent colleague, Dr. J. S. Newberry, has had large experience in the preventive employment of quinine against fevers on the Isthmus of Panama, and in various localities in the Western country, and gives his testimony strongly in favor

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* The bark of the dog-wood (*Cornus Florida*) is one of the best substitutes for Peruvian Bark. The wild cherry bark (*Prunus Virginiana*) is a well known tonic.

of its use. He is of opinion, however, that the constant use of the remedy diminishes its power, and that it is advisable to cease taking it at intervals; for example, to take it for two weeks and then omit for one week. On this point, as we shall shortly see, the weight of evidence is rather against this opinion.

In one of the British Navy Medical Reports—No. XV., "*On the prophylactic influence of quinine*," by Alexander Bryson, M. D., R. N.—the following statements occur:*

"It has long been a standing rule in the Navy, enjoined by the 9th Article of the Surgeon's Instructions, that when men are to be sent on shore in tropical climates, to procure wood and water, or on other laborious duties, the surgeon, if he consider it advisable, is to recommend for each man, previously to his leaving the ship, in the morning, a dram of powdered bark (Peruvian), in half a gill of wine, and the like quantity of wine after the mixture; or, if there be no wine on board, one-eighth of a gill of spirits, mixed with the fourth of a gill of water, is to be used in lieu of it; and the same proportion of each is to be given to the men on their return to the ship in the evening."

As evidence of the beneficial influence of this measure, the following instances are related:

"Twenty men and one officer were employed on shore for one day at Sierra Leone; to the former bark, mixed with wine, was given; but the latter refused to take it. He was the only person of the whole party who was subsequently attacked with fever. Again, two boats' crews were detached from the *Hydra* to examine the river Sherbro. They remained away for a fortnight, and during the whole time took bark and wine as directed by the instructions, yet, though the locality is a most dangerous one, not one case of fever followed; but another boat's crew, who were absent for two days only, in the same locality, and at the same time, who did not take bark were all attacked except the officer in command of the boat."

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* Medical Times and Gazette, London, January, 1854.

In a report on the African station, in 1847, Dr. Bryson, feeling "the most perfect faith in the preventive influence of quinine, and trusting to its well known antagonism to the recurrence of periodic diseases," suggested, for obvious reasons, that it should be employed as a prophylactic in the Navy instead of bark, "and that its use should be continued, not only while the men were exposed in unhealthy localities, but *for at least fourteen days after they returned on board*, in order that the antagonistic influence of the medicine might be kept up until the incubative period of the disease had expired. The suggestion was adopted, and the results, upon the whole, are most satisfactory. A strong spirituous solution of *amorphous* quinine* was mixed with several pipes of wine, in the proportion of four grains of the salt to an ounce of the wine." This preparation, under the name of "quinine wine," was added to the medical stores of the cruisers employed on the African station, and the following extracts from the reports of the surgeons in charge of the several ships afford evidence of the effects which were observed to follow its use :

"While coaling at Sierra Leone, writes Surgeon Sibbald, the weather was very wet, and on their several duties both men and officers were much exposed to the rain. An extra allowance of grog and quinine was given to each man, and continued afterwards for a day or two to such as required it. Mr. ———, however, placed no faith in its preventive influence, and would not take it, and he alone suffered an attack of fever, which proved fatal.

"A boat's crew, belonging to the *Pluto*, were employed for twenty-five days up the Congo. The wine was regularly supplied, but it caused one

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* Amorphous quinine is obtained from the "mother waters," after the pure quinine has crystalized. It is to be obtained from the manufacturers of quinine, and enters into the composition of several patent medicines which have a reputation for curing agues. It is much cheaper than pure quinine, and a little more than half its strength.

of the men to vomit, and therefore he discontinued its use; he was the first to suffer from fever. Only one other case occurred among the crew.

"During our stay in the river Lagos, quinine wine was regularly offered to the men, morning and evening—all took it, I believe, except two midshipmen and two seamen belonging to the galley. These four persons subsequently each suffered a severe attack of fever. While in the whole force, consisting of upwards of 220 men, there occurred only a few other cases of trifling importance. (Report of Mr. Heath, Surgeon of the *Teazer*.)

"Thirty-six men belonging to the *Water-Witch* were employed in the attack on Lagos; they were in the river four or five days, and, with the exception of three, all took quinine wine while there, and for fourteen days after they left it. Of the whole number five only were attacked with fever, namely, the three men who did not take the wine, and other two, who most imprudently exposed themselves to the sun, and bathed while much heated by violent exercise. (J. Henderson, Esq, M. D.)

"On the morning of the 25th of November, seventy-seven men of the ship went up the river Lagos to attack the town. Before starting, every officer and man was ordered to take a glass of quinine wine, and a sufficient quantity was put into the boats to repeat the same at night. All, to the best of my knowledge, took it, with the exception of Mr. D., master's assistant, who rather plumed himself on having escaped *taking a dose of physic*. This young gentleman, on the 10th of December, just a fortnight after, was seized with a violent attack of remittent fever; and, of the whole number who entered the river, he is the only one who, up to this date (the 7th of January), has been attacked."—(*F. Stupart, Esq., Surgeon.*)

In another of the (British) Navy Medical Reports (No. XXX.), "On the Endemic Fevers of Africa, and Prophylactic Use of Quinine," by L. J. Hayne, Esq., Assistant Surgeon, R. N., the following passage occurs:*

"The following instances will tend to show the beneficial influence of quinine, as a preventive in coast-fever. The boats were dispatched with thirty-two officers and men up the Rio Ponga, and remained in the river for two days and nights; one ounce of quinine wine (four grains to the ounce), was given daily to each person; between the twelfth and fourteenth day after leaving the river, four slight cases of fever occurred, which readily

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* London Medical Times and Gazette. March 1854.

yielded to treatment. In another instance the boats were away up the Lagoon, at Lagos, with thirty-four officers and men, for seven or eight days; a dose of quinine was given to each *every other day only*, and seventeen of the thirty-four were afterwards attacked with severe remittent fever. Again, one officer and one man were living on shore at Sierra Leone, for eight days, awaiting the arrival of a man-of-war; neither took any quinine, and ten days after they arrived on board their ship, both had remittent fever.

"It is not to be supposed that quinine will prevent the occurrence of fever in every case, but in a sufficient number to be of the utmost benefit, and the fever occurring in those cases in which it has been employed as a preventive, is sure to be of little moment."

From these quotations, which might be extended if space permitted, it is evident that the power of quinine as a preventive of malarial disease, is recognized in the British naval service; there is also abundant evidence on record of its acknowledgment by the army authorities.

In a "Report on the Topography of the Military Stations in British Guiana," by Surgeon-Major H. C. Reade, of the Army, the following recommendation occurs:*

"As a prophylactic measure, I would urge the advisability of administering quinine to the men, more particularly during the rainy seasons and the prevalence of an epidemic."

During the preparations for hostilities in China, in 1859, a series of suggestions were submitted to the consideration of the Minister of State for War, by the Director-General of the Army Medical Department, amongst which we find the following:

"4. That a stock of quinine wine be provided, in order that a ration of it may be given to the men (at the recommendation of the principal medi-

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* Statistical, Sanitary, and Medical Reports for the year 1859 (Army Medical Department), presented to both Houses of Parliament, by command of her Majesty. London, 1861, p. 243.

cal officer), previous to and during the unhealthy months, or when the soldiers are required to proceed up the rivers, or on being encamped in the vicinity of marshy ground. A medical officer should be present when the quinine wine is issued, and to witness the same being drunk by the men."*

Under the new Medical Regulations for Field Service in the British Army, a sanitary officer to the expeditionary army (to China), to be attached to the Quartermaster-General's Department, was selected and furnished with instructions for the performance of his special duties. Of these instructions, paragraphs 7 and 8 are as follows:

"Should the force have to advance through malarious districts, or at unhealthy seasons, you will indicate the best means of mitigating or preventing attacks of disease on the march or advance.

"With reference to the above object, it will be very requisite that the men should have some refreshment, as coffee, before marching. And, from the very favorable result of its use in the China command, quinine wine is to be recommended for use during the months when fever and bowel complaints prevail, or at any epidemic season; and of this prophylactic each man should have a daily ration, to be taken in the presence of a responsible officer."†

As evidence of the views and opinions on the subject held by the medical officer highest in rank in the British army, and of the provisions made for the ample supply of the British army in the Crimea with quinine to be employed as a prophylactic, the following letter to the Inspector General of Hospitals in the Crimea, is subjoined :‡

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* Sanitary Report for 1859, ut supra, pp. 179–180.

† British Army Reports for 1859, p. 181.

‡ Report of the Commissioners appointed to inquire into the regulations affecting the sanitary condition of the army, the organization of military hospitals, and the treatment of the sick and wounded. Presented to Parliament, &c., 1858. App. 79, p. 71.

ARMY MEDICAL DEPARTMENT,
27th July, 1855.

" Sir,—With reference to previous letters on the subject of administering quinine, and other preparations of bark, as prophylactic remedies, I have the honor again to draw your attention to the matter.

" From all I have learnt I am persuaded that the number of cases of fever would be diminished by such a course. So convinced am I, especially by the results of the experience of naval medical officers, of the benefits arising from the prevention plan, when followed in localities in which remittent and intermittent fevers are likely to prevail, that I have taken care to provide ample supplies of quinine in anticipation of every possible demand for that article.

" Having now at command sufficient of this drug, specially provided for that service, to furnish five grains per diem to every member of a force of 35,000 men, I beg you will take such measures as you think proper, with a view to induce the medical officers to employ that remedy, in the hope that it may prove useful in warding off attacks of fever, &c.

" I have the honor to be, &c. &c.,

(Signed) " A. SMITH.
" Director General."

" Dr. HALL,
" &c., &c."

The evidence collected from the recorded experience of intelligent and reliable travellers and explorers in malarial regions, and from the British merchant service, fully confirm the facts derived from military and naval reports. The quotations appended, fairly illustrate its general tenor. The remarks on African fever in the second quotation, are recorded in consequence of their truth and force, and because they demonstrate its identity with the miasmatic diseases of our own country.

" Of the measures, as hygienic, most were of a general nature, the only more specific ones being the free use of quinine. The amount of sickness was very little, so that, except with the scorbutic cases, Dr. Hutchinson's really medical duties were not onerous. Of the Europeans, the most exposed to climatial influences were Mr. Harcus, Mr. Guthrie, Mr. May, and myself; Mr. Harcus was chiefly exposed during the day, and suffered only from frequent headaches from the effects of the sun's rays. Mr. Guth-

rie, besides undergoing daily an immense amount of fatigue, slept regularly on deck, and, nevertheless, escaped entirely. Mr. May and I went ashore whenever opportunities occurred, and as often by night as by day, we had frequently to land in swamps and other unhealthy spots, yet Mr. May had only one short and not severe febrile attack; I, in addition, always slept on deck, and was roused regularly at twelve o'clock, and at three in the morning for the purpose of recording meteorological observations; but while in the river I had constant health. I mention these circumstances to show that under proper precautions, Europeans may not only live quietly, but even commit with impunity what some years ago would have been considered indiscretions."—*Baikie's Exploring Voyage, p.* 328.

"It will be sufficient here to say that African fever has nothing specific about it, that it is certainly not *sui generis*, and that it is merely an aggravated form of the disease known in this country as ague.

"The various divisions into continued, remittent, and intermittent, are only calculated to puzzle and to mislead; they refer to degrees and not to actual differences; and these forms gradually, but surely, merge into each other. In its mildest form the fever is intermittent, that is to say, between the paroxysms intervals of health occur; more aggravated, the complaint becomes remittent, meaning, that between the febrile accessions the symptoms only remit, but do not altogether disappear; in its greatest severity the disease is *quasi*-continued, or to the unpracticed eye seems to be devoid of paroxysmal changes, but to proceed with an undeviating deadly career. But in all of these the poison, the original cause of the malady, is essentially the same, and the results depend partly on constitutional causes, partly on the amount and virulence of the poison imbibed.

"The same amount of poison will, as is the case with alcohol, affect two persons inhaling it in very different degrees. The disease is what is termed by medical men 'antiperiodic,' and the remedies required are 'antipenodics,' of which the best known and the most efficient is quinine. This may be given as soon as the complaint shows itself, and the sooner the better, as it is the main-stay of the sufferer; of course various occasional symptoms may occur during its progress, which will require to be treated according to circumstances.

"But the great modern improvement is the discovery that quinine not only cures but that it actually *prevents;* and that by taking this invaluable drug while in unhealthy localities persons may escape totally unscathed. The best form to use for this purpose is quinine wine, of which

half a glass should be taken in the morning, and repeated, if requisite, in the afternoon.

"Experience likewise proves that if endemic fever seizes a person who has been using quinine as a prophylactic, he will escape much more easily, and have a milder and more manageable attack than another who has not been so employing it."—*Baikie's Exploring Voyage. App. G., by the Surgeon of the Expedition.*

"From the day before we crossed the bar, in the Pleiad's voyage, I commenced giving quinine solution to all the Europeans on board. Not having a sufficient quantity of the medicated wine, I dissolved the sulphate (of quinine) in like proportions in water, adding two glasses of wine to my solution. Some of the officers at first grumbled in taking it, and drank it with a very sour face; but soon all, with one exception, came to be so anxious for it, that had I not made a rule to put the bottle and glass over the engine room every morning at day-break, they would be down at my bedside for the dose. The man whom I could not train into taking it was one of our second mates, who in the course of our voyage had a few severe attacks of remittent fever, accompanied with delirium. * * * "I think the fact which I am about to state here will answer the following paragraph in Dr. Bryson's suggestions :—'Whether or not the influence of quinine on the system, like that of other medicines, becomes lessened by long continued use, we have no knowledge; possibly the question may be determined during the present expedition.' I had it dispensed daily for the Europeans under my charge, from the day before we crossed the bar to three weeks after our return to Fernando Po, a period of one hundred and forty days. *In no single case could I recognize its failure;* when some of our officers, who from not taking it punctually, got slight attacks of remittent fever, the accession always yielded to appropriate remedies, with doses of quinine increased to ten grains. The symptoms subdued, I returned to the original dose of quinine, observing after each occurrence the precaution to lecture them on their irregularity in taking it, pointing out its benefits, and impressing them with the fact that our return through the delta would be at the most unhealthy period of the year. Despite of these attacks, and of our prolonged stay up the river, we had the same number and the same men on our return to Fernando Po that we had on board when leaving it on the 8th July." The preservation of their health he attributes to several hygienic precautions, the principal of which was "to my having induced the Europeans *to take quinine solution daily*, without making any fuss, for its palpable necessity."—"*Impressions of Western Africa.*" *By T. J. Hutchinson, Esq.*,

Her Majesty's Consul for the Bight of Biafra. Longman, 1858, *p.* 229.

By enforcing the systematic use of quinine, as a prophylactic, upon all the persons in their employment, the remarkable result was secured by the Messrs. Laird, which is set forth in the following letter from a member of that enterprising firm, whom the writer saw professionally during his recent visit to this country:

"1 Leadenhall street, London,
26th July, 1861.

"Dear Sir,—Referring to my interview with you last month, and to the effects of quinine in African fever, I now enclose memoranda on that subject.* My firm of Laird, Fletcher & Co., Liverpool, are the managing agents for a line of steamers to the coast of Africa, carrying H. M. Mails once a month from Liverpool, to thirteen different ports on the coast of Africa, laying between the Island of Madeira and Fernando Po. These vessels run about 10,000 miles out and home in ten weeks, and since the establishment of the line, about seven years ago, *no European has lost his life in connection with the service*, except from causes which might have produced his death in any other part of the world.

"During the past five years my late brother (Macgregor Laird) established steam communication with the interior of Africa, by means of the river Niger and its tributaries, making several ascents of the river during the rainy season when its waters were high. None of the Europeans connected with these expeditions have died from fever.

"I have this month sent an exploring steamer up the same river to return in September, and do not anticipate any loss of life. * * * *

"I am very truly yours,

"Wm. Laird."

Dr. Van Buren,
&c., &c.

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* This memorandum contained a printed abstract of experience on the preventive use of quinine, (from which the preceding quotations were extracted,) prepared for the guidance of persons in the employ of the company.

Sir J. Emerson Tennant (Ceylon, vol. 1, p. 76), gives his experience as follows :

"In traversing districts suspected of malaria, experience has dictated certain precautions, which with ordinary prudence and firmness, serve to neutralize the risk,—retiring punctually at sunset, generous diet, moderate stimulants, and the daily use of quinine both before and after exposure. These * * * have been proved, in long journeys, to be valuable prophylactics against fever and the pestilence of the jungle."

"It is found that these alkaloids given in certain doses, not only cure the disease, but that if administered to those exposed to the malarious exhalations, they prevent the attacks of the disease altogether."—*Encyclopedia Brittanica, Art.* "*Intermittent Fever.*"

"From the day of my arrival on the coast I took quinine morning and evening in doses of three or four grains. This I have found a good preventive. * * * *

"During my whole stay in Africa I took from time to time, even when in perfect health, doses of quinine wine as a prophylactic or preventive against malaria."—*Du Chaillu's Equatorial Africa, Chap.* 18, *p.* 369.

In conclusion, it may be fairly assumed, even from the evidence thus imperfectly and hastily collated, that the power of Quinine as a preventive of miasmatic disease, is fully established as a medical fact; and that it can be employed, not only with entire safety, but with the greatest advantage, even to the saving of life, by healthy persons exposed to malarial influences. Viewed in the light of humanity, as well as of economy —both of men and money—the prevention of disease is of far greater importance than its cure, and your Committee venture to express the opinion that intelligent and judicious action on this important subject at the hands of the proper authorities would save much sickness and many valuable lives during the present campaign.

On behalf of the Committee.

Wm. H. Van Buren,
Chairman.

At a meeting of the Committee of Inquiry of the Sanitary Commission, Sept. 30th, 1861, it was

Resolved, That the Report of the Committee on the use of quinine as a prophylactic be printed as a document of the Commission, and put into immediate circulation, especially among the Surgeons of the Army and Navy, and that copies be sent to the Surgeon General and to all the heads of Departments.

Resolved, That the Secretary of War be urged to draw the special attention of the Medical Bureau to the subject and to the conclusions of this Report, and that he be respectfully advised, if approving the Report, to instruct the Surgeon General to place "quinine wine," or "bitters," among the articles which may be drawn by ordinary requisition by the Medical Officers of the Army.

Resolved, That the President and Secretary, with Dr. Wood, be a committee to carry these resolutions into early effect.

H. W. Bellows,
Chairman.

No. 31.